

*Declaration of Dr. Richard Fletcher under 37 C.F.R. 1.132  
U.S. App. Ser. No. 10/625789  
Attorney Docket: 056754/0124941*

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

Applicants: Fletcher et al	
Application No.: 10/625,789	Group Art Unit: 2876
Filed: 7/23/2003	Examiner: Lee, Seung H.
Title: Methods and Apparatus for Counting and Positioning Using Resonant Tags	
Attorney Docket No.: 056754/0124941	

Commissioner for Patents  
P.O. Box 1450  
Arlington, VA 22313-1450

**DECLARATION OF DR. RICHARD FLETCHER UNDER 37 C.F.R. 1.132**

Dr. Richard R. Fletcher submits the following declaration:

1. I am an inventor on U.S. Pat. App. Ser. No. 10/625,789 ("the '789 application") and a Visiting Scientist at the Massachusetts Institute of Technology ("MIT") Media Laboratory.
2. On July 14, 2006, I performed an experiment that replicated earlier experiments that demonstrated that the method of Ekchian et al, as described in U.S. Pat. No. 4,862,160 ("Ekchian"), does not function as intended when the tags are close together. Documentation of the results obtained from this experiment is attached hereto as Exhibit A.
3. The experiment that produced the results shown in Exhibit A was performed at the MIT Media Laboratory, Cambridge, Massachusetts on July 14, 2006. The measurements were made using an HP 8753D Vector Network Analyzer. The tags were standard planar

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8.2Mhz LC tags (Electronic Article Surveillance "EAS" tags) manufactured by Tyco Sensormatic.

4. As shown in Exhibit A, page 1, with one tag, the measured frequency was 8.3 MHz.
5. As shown in Exhibit A, page 2, when a second tag was added on top of the first, the measured combined frequency was shifted to 6.7 MHz and the resonance peak amplitude was decreased.
6. As shown in Exhibit A, page 3, when a third tag was added on top of the first two, the measured combined frequency was shifted to 5.9 MHz and the resonance peak amplitude was further decreased.
7. As shown in Exhibit A, page 4, when a fourth tag was added on top of the first three, the measured combined frequency was shifted to 5.2 MHz and the resonance peak amplitude was significantly decreased.
8. As shown in Exhibit A, page 5, when a fifth tag was added on top of the first four, the measured combined frequency was shifted to 4.9 MHz and the resonance peak amplitude was further significantly decreased.
9. Exhibit A, page 6 depicts a graph of the measured combined frequency versus the number of tags when the tags are in close proximity. The relationship between the measured combined frequency and the number of tags follows exponential dependence.
10. As described in U.S. Pat. No. 4,862,160, the method of Ekchian calculates the number of tags from the amplitude of the received signal, using the area under the curve. When there are more tags present, the Ekchian method requires that the amplitude will increase.
11. As can be seen from Exhibit A, when the tags are close together, the amplitude does not increase with an increasing number of tags. Instead, the received frequency is shifted and the amplitude decreases.
12. The results discussed in this Declaration and documented by Exhibit A therefore show that the method of Ekchian does not function as intended when the tags are close together.


The undersigned hereby declares that all statements made herein are based upon his own knowledge and are true, and that the statements were made with the knowledge that willful false

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statements and the like are punishable by fine or imprisonment, or both under Section 1001 of Title 18 of the United States Code and that such willful statements may jeopardize the validity of the application or any patent issued thereon.



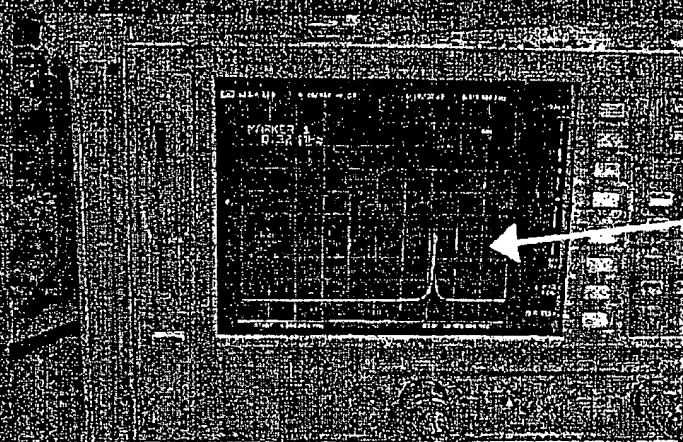
Richard R. Fletcher, Ph.D.



Date

## Exhibit A

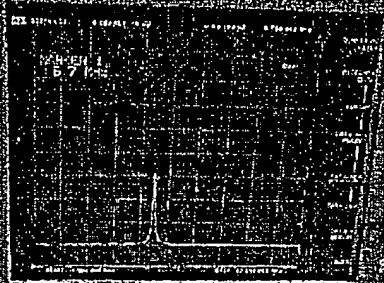
# Test with one tag



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Ex. A

## Adding another tag



Frequency is shifted

$F = 6.7 \text{ MHz}$

This is unexpected result

Not predicted by Prior Art

Also, Amplitude is NOT  
increased

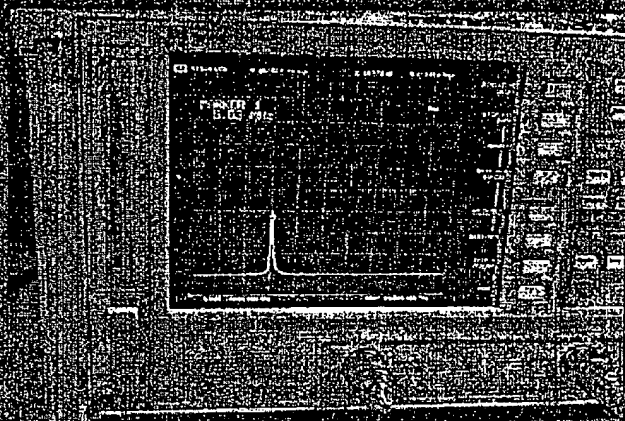
-- in fact, the amplitude is  
decreased

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Ex. A

# 3 Tags



More frequency shift  
 $F = 5.9 \text{ MHz}$

Amplitude is decreased

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Ex. A

# 4 Tags



More frequency shift  
 $F = 5.2 \text{ MHz}$

Amplitude is decreased

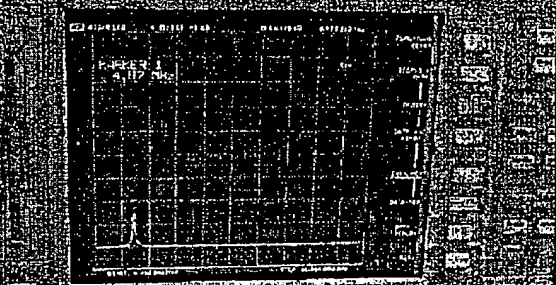
MIT Media Lab

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Ex. A

# 5 Tags



More frequency shift  
 $F = 4.9 \text{ MHz}$

Amplitude is decreased

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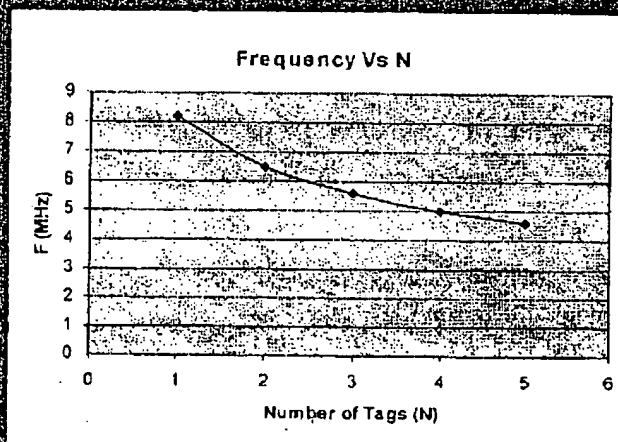
USPN 10/625,289

Ex. A

# Experiment Summary

We see that N and F indeed follow exponential dependence:

N	F
1	8.2 MHz
2	6.5 MHz
3	5.6 MHz
4	5 MHz
5	4.6 MHz



MIT Media Lab

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